DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:	Approved Oil Services, Inc.
Facility Address:	5390 East 72nd Avenue
Facility EPA ID #:	COD060627262

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.
___ If no - re-evaluate existing data, or
___ If data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be **contaminated**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

____	If yes - continue after identifying key contaminants, citing appropriate" levels," and referencing supporting documentation.
X	If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
____	If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Water quality data collected at the facility show that contaminants, primarily chlorinated volatile organic compounds (1,2-dichloroethane, tetrachloroethylene and trichloroethene), have historically been present in ground water at this facility. Contaminant concentrations have always been marginally above established State of Colorado ground water standards. Records also show that a limited quantity of non-aqueous phase liquid has been observed floating on the water table in two monitoring well locations. Data contained within the December 10, 2003 "AOS Project Completion and Remediation Summary Report, Approved Oil Services Site, Commerce City, Colorado" confirmed that this contamination was still present at the site when samples were collected on August 28, 2003.

A review of all historical ground water monitoring data, including the test results contained within the December 10, 2003 "AOS Project Completion and Remediation Summary Report", and knowledge of remedial activities conducted at the facility indicates the following regarding the stability and fate of the observed low level contamination:

1. Limited testing conducted in the past showed that the relatively low concentrations (at or below State of Colorado ground water standards and MCLs) of chlorinated solvents observed in ground water were not increasing.

2. Approved Oil Services installation and limited operation of a system to air sparge ground water in the mid-1990's was successful in reducing contaminant concentrations.

3. Remedial activities conducted at the site during the summer of 2003 resulted in the excavation of 2,830 cubic yards of contaminated soil that acted as the source of this ground water contamination. The excavations in several on-site areas extended down to the water table, meaning that this source material has largely been removed and will no longer be capable of leaching constituents into ground water.

4. On August 28, 2003, following the removal of contaminated soil from the Approved Oil Services facility, ground water samples were collected from one upgradient and four downgradient monitoring wells. With the exception of a PCE detection in one well, all VOC and SVOC constituents were below established water quality standards. One downgradient well contained PCE at a concentration of 7.2 ug/L, slightly above the 5 ug/L standard. The nondetect concentrations for the majority of analytes represents a decrease from historical sampling results. Considering 1) the limited volume of ground water that is impacted, 2) the fact that shallow ground water in the area is not used as a source of drinking water, and 3) the land use of the surrounding properties, this single detection of PCE marginally above the established standard does not pose a risk to human health or the environment.

5. Two downgradient monitoring wells have historically contained measurable quantities of LNAPL. The analytical results of ground water collected from these two wells were all nondetect for VOCs and SVOCs, indicating that these isolated pockets of residual NAPL are not a source of dissolved phase contamination in ground water.

6. The LNAPL has been described as a waxy and highly viscous oil that could not easily be pumped from the wells. Historically, the LNAPL thickness measured in the wells was typically less than a few inches, indicating a small volume that was close to residual saturation (i.e., not mobile in ground water).

Although residual contamination is present at the site, the low concentrations, limited volume, relative immobility, and/or tendency for this type of contamination to naturally attenuate indicate that it does not pose a threat to future occupants of the site and the adjoining properties. Based on this knowledge, the Department has determined that the approved remediation workplan was successfully implemented and all TPH-impacted subsurface soils that represented a potential source of contamination have been removed from the Approved Oil Services property. The site has consequently achieved the clean closure performance standard (unrestricted use) and was deemed to be protective of human health and the environment for all land uses. The Department and EPA subsequently designated the site as having been clean closed and approved the Stakeholders request for a no-further-action determination.

Footnotes:

[1]Contamination and contaminated describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate levels (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

___ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

___ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter NO status code, after providing an explanation.

___ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does contaminated groundwater **discharge** into **surface water** bodies?

____ If yes - continue after identifying potentially affected surface water bodies.

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level" and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

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___ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>key</u> contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

___ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

___ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

___ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site=s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

___ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable"**) - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

___ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?

   ____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

   ____ If no - enter "NO" status code in #8.

   ____ If unknown - enter "IN" status code in #8.

   Rationale and Reference(s):

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Approved Oil Services, Inc. facility, EPA ID # COD060627262 located at 5390 East 72nd Avenue, Commerce City, Colorado. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that approved and implemented remedial actions conducted at the site will ensure that the minimally contaminated groundwater remains within the "existing area of contaminated groundwater." This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

___ NO - Unacceptable migration of contaminated groundwater is observed or expected.

___ IN - More information is needed to make a determination.

Completed by	(signature)		Date	
	(print)	Walter Avramenko		
	(title)	Corrective Action Unit Leader		

Supervisor	(signature)		Date	
	(print)	Joe Schieffelin		
	(title)	Program Manager		
	(EPA Region or State)	Colorado		

Locations where References may be found:
Colorado Department of Public Health and Environment Records Center 4300 Cherry Creek Drive South Denver, Colorado 80246-1530 303-692-3331

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